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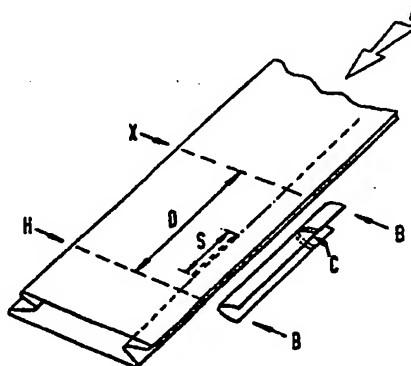
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(54) Valve sack and method of making it.

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(57) A valve sack is made from tubular material whose opposed longitudinal edges have been gusseted. There is formed in one of the gussets an aperture (S) which extends along the gusset for a distance appreciably less than the width (D) of eventual sack. The outer longitudinal edges of the gusset are then sealed together, either directly or via a further sheet of material, over a distance greater than the length of said aperture, to form a tube running along one longitudinal edge of the material. The material is then sealed together along two lines which run across the material and are spaced apart to define the width of the eventual sack. One end of the tube is sealed off. A further aperture overlapping the first mentioned aperture is formed in the tube.



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"VALVE SACK"

The invention relates to valve sacks.

It is known to construct valve bags or sacks from

- 5 paper, polythene and the like in so-called block bottom style. The flat tube of material which forms the bag is folded and sealed, across its length, at each end but at one end a valve is incorporated in the folds. The valve is a flat tube of paper, polythene or the like which allows access through the folds into the bag. When the bag is filled, and stored with the valve at the base of the bag, the contents cannot inadvertently be poured out of the bag because the pressure of the contents on the flat tube of the valve effectively seals off the valve opening. The bag must be cut open to release its contents.

These conventional block-bottom valve sacks are very widely used, but they have drawbacks: they are relatively expensive to make, they are confined to a relatively limited range of overall sizes, and there is a tendency for plastics block-bottom sacks to "balloon" during filling.

- 25 To make bags according to the invention involves two major departures from the accepted "block bottom" method outlined above. Firstly, the initially flat tube of film is gusseted along its opposed longitudinal edges, and secondly, the film is sealed across its length but the sealed regions define the sides, not the ends, of the finished bag.

30 The single Figure of the accompanying drawing shows diagrammatically a method of making valve sacks from

clear plastics film.

Using polythene film by way of example, and referring now to the accompanying drawing, Arrow A indicates the direction of feed of a longitudinally continuous gusseted tube. As the tubing advances intermittently, slits are made in the base of one of the gussets. This slitting is performed by a thin blade (not shown) lying flat within one of the gussets so that the film normally slides past it. At intervals, the blade is pushed deeper into the gusset to cut through the base of the gusset and make a slit "S". The position of this slit will normally be arranged to fall within the range of approximately one-fifth to three-fifths of the distance "D" between the subsequent cross seals which define the edges of the finished bag.

After the slit is made in the base of the gusset, a strip of centre-folded film equal in measurement to the width of the finished bag is fed into the gusset as indicated at "B". The longitudinal edges of this strip are then welded to the outer longitudinal edges of the gusset along the film for a distance equal at least to the desired width "D" of the bag being made. This has the effect of making a tubular form between the strip of centre-folded film and the sides of the gusset, and as the drawing shows the slit "S" in the gusset is covered by the strip of film.

Either before or after the additional strip of film has been welded to the gusset, it is itself slit (or perforated) as indicated at "C". As shown in the drawing, the slit is at an angle to the slit "S" in the gusset and is longitudinally displaced from it.

The sealing technique uses a side welding bar "H" positioned across the direction of feed "A" of the gusseted film. At intervals synchronised with the

- operations of slitting the gusset and welding-in the additional strip of film, the welding bar is pressed against the film to make cross-welds indicated by broken lines in the drawing and spaced apart by a distance "D" equal to the desired width of the finished bag. Whilst the film is still molten and held under the welding bar, the film is pulled apart at the weld leaving a seal at each side of the break. As the film advances and the sealing is repeated at suitably spaced intervals, bags are formed between the welds.
- These welds then become the sides of the bag, and when the welds have cooled the bag can be pushed out around its gusseted ends to give a square base (and top) similar to a "block bottom" sack.
- When this has been done, the slit "C" in the base of the bag defines a flap which will lift to give an entrance to the space between the extra welded-in strip of film and the sides of the gusset that strip covers.
- The bag can then be filled by pouring or blowing material with a suitable nozzle through this flap and into the bag through the slit "S" in the gusset. During filling, the filling aperture would normally be at the top of the bag. Subsequently, the material cannot be poured out of the bag because, when the bag is inverted after filling to stand on its base, pressure of the material in the bag presses the gusset walls against the welded-in film strip and this seals off the exit.
- A variation of the above construction can be achieved, still using a similar technique and gusseted tubing, but this time no extra strip of centre-folded sheeting is fed into the gusset after slitting. The slit in the base of the gusset is made in the same manner as previously described. It is then arranged that a heat-sealing bar welds across the gusseted tubing at X after the slitting

operation in the gusset. A shim of P.T.F.E. is allowed to trail in the gusset and under this sealing bar so that the two inner faces of the gusset do not weld together 5 at any point. To prevent this cross-weld parting, while soft, under the normal tension of the machine, an arrangement of cooling air jets and extra feed rollers may be necessary.

After leaving this welding position, the film is 10 moved forward a distance equal to the required width of the bag. At the same time, the two longitudinal edges of the gusset are now welded together for a length equal at least to the width of the bag and encompassing the slit contained in the base of the gusset. A further heat-sealing 15 bar then welds across the film, in a position closely adjacent the first cross-weld and this time including welding the gusset together. A cutting blade between these two closely-adjacent welds parts the bag across the film, and the process is repeated sequentially. The 20 gusseted edges of the film form the ends of the finished bags.

Bags made in this manner will have a tube across the top of the bag with an opening at one end. Material poured into this opening will fall into the body of the bag through 25 the slit in the bottom of the gusset but when turned upside down it cannot get out again because the tube forms a valve. The gusseted base of the bag will open out to a square form similar to a "block bottom" sack.

It is sometimes necessary, particularly when 30 powders are being forcibly blown into a valve sack, for the air to be able to escape. This is very easily accommodated with the sack incorporating the extra strip of film in the gusset. If the bottom corners of the empty sacks are perforated within a right-angled triangle 35 defined in the corner whose short sides are of a length

not exceeding the depth of the gusset, the perforations will allow the pressurised air to escape when the bag is being filled and the filling "tube" is open, but will 5 automatically be sealed off when the bag is subsequently inverted. The perforated holes may also be utilized to give moisture permeability to the bag, the size and number of the holes being made to suit requirements.

Although the invention is ideally suited to plastics 10 which can be heat-welded, the same principle can be applied to paper, woven polypropylene, Hessian and the like where adhesives or sewing methods are used. The formation of the sack is the same but the method of sealing is that most appropriate to the material being 15 used.

In a modification to the construction described and illustrated, either or both of the slits "S" and "C" are formed as lines of weakening or perforations in the film: 20 when the bag comes to be filled, the filling nozzle punches through the weakened or perforated lines and creates the slits which admit the contents to the bag. A similar modification can be made to the second construction described.

Either of these constructions of bag can be provided 25 with a carrying handle, by sealing along the top edge of the finished bag (i.e. along the edge running from H to X in the drawing) and then punching a hand-hole (or two spaced-apart hand-holes) in a sealed area. The said seal could be taken along a line running parallel to the bag's top 30 edge, and spaced inwardly from it. Alternatively the seal could fuse all four thicknesses of film together along a relatively wide area running parallel to the bag's top edge, so that a rigid band is formed along the top edge of the bag in which the or each hand-hole can be punched. In either 35 case, of course, the seal must close the base of the gusset.

CLAIMS:

1. A method of making a valve sack, the method involving the use of tubular material whose opposed longitudinal edges have been gusseted, and comprising the steps of forming in one of the gussets an aperture (or a weakened area which can subsequently be broken to form an aperture) which extends along the gusset for a distance appreciably less than the width of the eventual sack; sealing the outer longitudinal edges of the gusset together, either directly or via a further sheet of material, over a distance which is greater than the longitudinal extent of said aperture (or weakened area), to form a tube running along one longitudinal edge of the material; sealing the material together along two lines which run across the material and are spaced apart to define the width of the eventual sack; sealing off at least one end of said tube; and forming in the said tube a further aperture (or a weakened area which can subsequently be broken to form an aperture) not overlapping the first-mentioned aperture (or weakened area).

2. A method according to claim 1, in which the said tube is formed by sealing each of the opposed longitudinal edges of an initially separate sheet of material along a respective one of the opposed outer longitudinal edges of the gusset.

3. A method according to claim 2, in which the said further aperture (or weakened area) is formed in the said initially separate sheet of material.

4. A method according to claim 1 or claim 2, in which the said further aperture is formed during the said sealing of the material and one tube end, by deliberately not sealing off the other end of the tube.

5. A method according to any of the preceding claims, in which the first-mentioned aperture (or weakened

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area) comprises a slit (or a line of weakening) in the base of the gusset.

6. A method according to claim 5, in which the slit (or the line of weakening) occupies between one-fifth and three-fifths of the width of the sack.

7. A method according to any of the preceding claims, in which one or both corners of the end of the sack along which the said tube extends is or are perforated, to allow escape of air during the eventual filling of the sack, the perforations being confined within one or both of two right-angled corner triangles whose non-hypotenuse side length is defined by the width of the flattened tube.

8. A method of making a valve sack, substantially as described herein with reference to either of the major examples.

9. A valve sack made by a method in accordance with any of the preceding claims.

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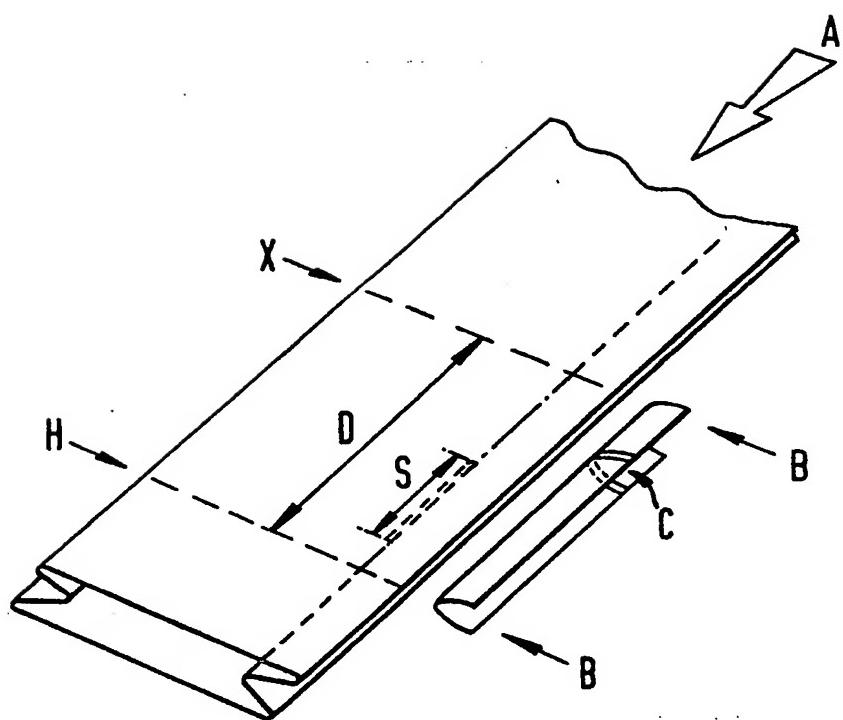
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European Patent
Office

EUROPEAN SEARCH REPORT

Application number

EP 78 30 0626

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl. ¹)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<p>GB - A - 1 035 248 (VEITH) * Page 2, line 53 to page 2, line 126; figures 1-8 *</p> <p>-----</p>	1-5	<p>B 65 D 31/14 B 31 B 37/84</p>
			TECHNICAL FIELDS SEARCHED (Int.Cl. ¹)
			<p>B 65 D B 31 B</p>
			CATEGORY OF CITED DOCUMENTS
			<p>X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons</p>
			<p>&: member of the same patent family, corresponding document</p>
<input checked="" type="checkbox"/> The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
The Hague	16-02-1979	CLAEYS	